

Connect 4 Manual

Description

This program allows the user to play 'Connect4', a popular game that has been played by millions. The game can either be run as a command-line game (playing the game within a command prompt) or the game can be played on a website viewed by a web browser. The assignment has been developed with version control by using GitHub and you can view our GitHub repository at: <https://github.com/faizan-mohiuddin/assignment3>.

System Requirements


- 'Ruby' installed on the machine/device that will be running the program.
- A Ruby gem (library) called 'Sinatra' needs to be installed as well.
- A web browser (preferably Google Chrome)
- An operating system: Windows 10, Windows 7 or other modern Windows operating systems. Other operating systems can be used but performance may vary.
- An internet connection. This is because the website takes the CSS (styling) from an external source through the internet called 'Bootstrap'.

Run Instructions

1. Open the Windows command prompt and use the cd (change directory) command to navigate in to the "connect4" folder.

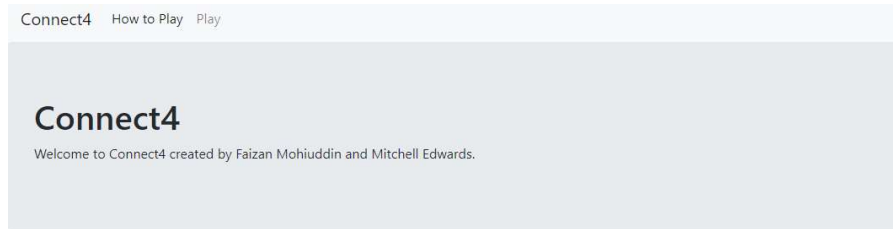
Example: cd *path*/connect4 (NB: replace *path* with your path to the connect4 folder)

2. Once you are in the connect4 folder, type "ruby wad_cf_run_01.rb".
3. You will be prompted to either run the command-line based game or the web-based game.
4. If you selected the command-line based game, the game will run on the command prompt and you can enjoy playing the game. However, if you selected the web-based game, continue to step 5.
5. If you have selected the web-based game, wait a moment for the server to run and your command prompt should look something like this

 C:\Windows\system32\cmd.exe - ruby wad_cf_run_01.rb

```
H:\wad\assignment 3>ruby wad_cf_run_01.rb
Enter "1" runs game in command-line window or "2" runs it in web browser.
2
Web-based game
[2018-11-15 19:48:05] INFO WEBrick 1.4.2
[2018-11-15 19:48:05] INFO ruby 2.5.1 (2018-03-29) [x64-mingw32]
== Sinatra (v2.0.3) has taken the stage on 4567 for development with backup from WEBrick
[2018-11-15 19:48:05] INFO WEBrick::HTTPServer#start: pid=4328 port=4567
```

6. Once the server is running, open your web browser and type “localhost:4567” in to the address bar, enter, navigate to the ‘Play’ web page (using the navigation bar at the top of the web page) and enjoy playing the game.



How to Play

Objective

The objective of the game is for a player to connect four of their tokens in a straight line (horizontally, vertically or diagonally).

Instructions

Click on the 'play' link in the navigation bar above.

In order to place a token, simply just hover over the column you would like to place your token in.

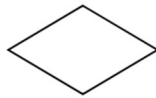
Once Player 1 has placed a token, Player 2 will be required a token and so on and so forth until there is a winner.

Flowchart (also viewable as picture)

Key:

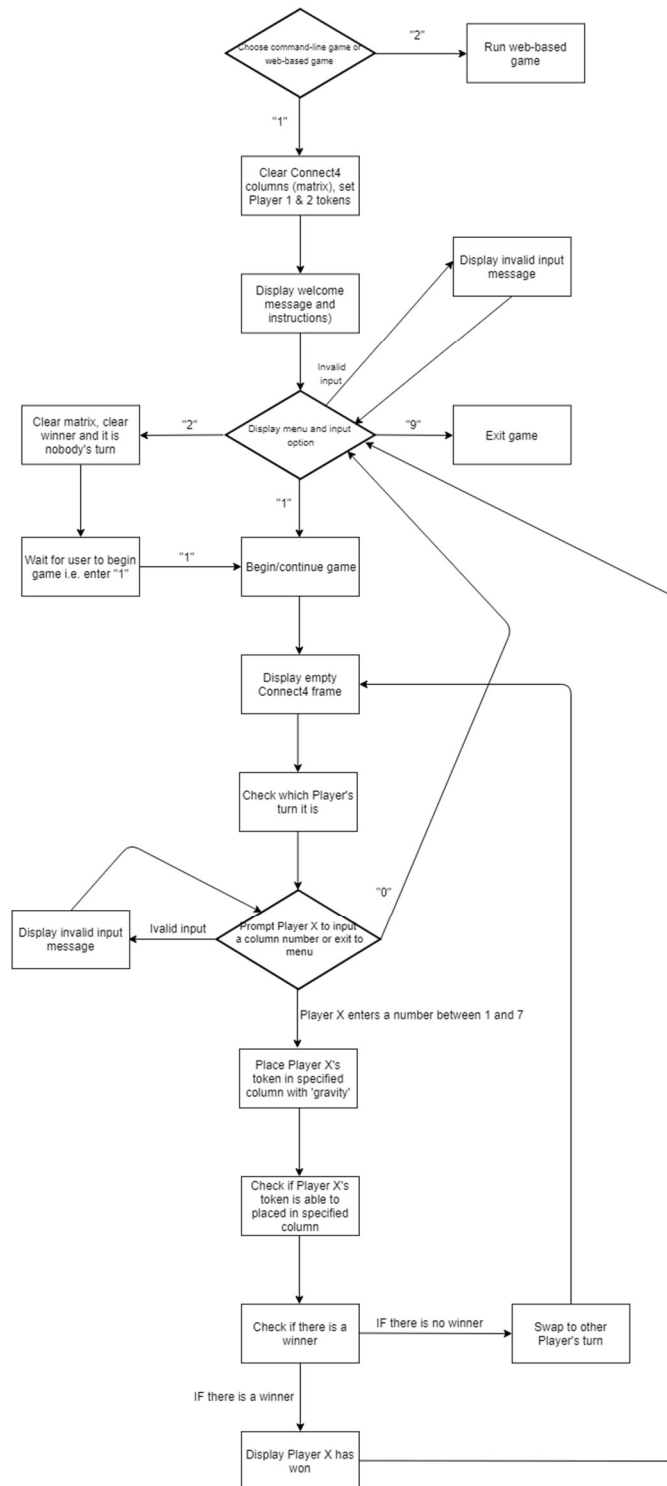


= Function



= Choice

Connect4 Flowchart



Features and Functionalities

Command-line Version

Start Menu (function)

```
Welcome to Connect 4!
Created by: Mitchell Edwards and Faizan Mohiuddin

How to play:
Player 1: O and Player 2: X
Enter the corresponding column number to place a token.
If at any point you are stuck or wish to take a break, enter 0 to return to the menu and pause the game.

Menu: (1)Start | (2)New | (9)Exit
Please enter your choice:
```

This function creates a type of user interface that makes it easier for the user to interact with the program. The interface explains instructions on how to play the game and a menu that does different things depending on the input from the user.

Start Menu Input Validation (feature)

```
Invalid input.
Menu: (1)Start | (2)New | (9)Exit
Please enter your choice:
```

This functional feature makes sure that whatever the user types in as the start menu input, is a valid input i.e. is either 1, 2 or 9. The program will keep asking for a start menu input until the user has typed in a valid input.

Start Menu – ‘Start’ Function (function)

```
Game on!

 1 2 3 4 5 6 7
+---+---+---+---+
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
+---+---+---+---+

Player 1 enter token (0 returns to menu):
```

This obvious function starts up the game. If the user wishes to start up a game that they were playing before – this is also accounted for. For example, if during a game, a player decides to return to the menu (typing 0 as an input), the game can be returned to and continued if the player uses the start function (typing in 1 as an input) again.

```

 1 2 3 4 5 6 7
+---+---+---+---+
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|_|0_|_|_|_|_|_|
|_|X|X|_|_|_|_|
|0|X|0|_|0|_|_|
+---+---+---+---+

Player 2 enter token (0 returns to menu):

```

(example of continued game)

Start Menu – New Function (function)

```

New game created!
Enter 1 in order to Start the game.

Menu: (1)Start | (2)New | (9)Exit
Please enter your choice:

```

If the user uses the ‘New’ function in the start menu (types in 2 as an input), the program will clear the board and creates a new game (resetting the winner, setting values within the matrix to be ‘empty’ etc).

Start Menu – ‘Exit’ Function (function)

This function simply closes the program if the user uses the ‘Exit’ function in the start menu (types in 9 as an input).

Prompting the Player to enter their token in to a column (function)

```

 1 2 3 4 5 6 7
+---+---+---+---+
|_|_|_|_|_|_|_|
|_|_|_|_|_|_|_|
|X|_|_|_|_|_|_|
|0|_|_|_|_|_|_|
|X|X|_|_|_|_|_|
|X|0|0|_|0|_|_|
+---+---+---+---+

Player 1 enter token (0 returns to menu):

```

This vital function takes in what column the Player wants to put their token in and swaps around which Player's turn it is.

Gravity (feature)

Notice how the tokens always drop down into the column instead of just being placed in a column cell as if it was suspended in mid-air? Another functional feature in the program is the 'gravity'. This piece of functionality makes sure that the token is dropped with gravity in the column.

Full Column Checker (feature)

```
This column is full please select a different column.

 1 2 3 4 5 6 7
+---+---+---+---+
|X|_|_|_|_|_|_|
|O|_|_|_|_|_|_|
|X|_|_|_|_|_|_|
|O|_|_|_|_|_|_|
|X|_|_|_|_|_|_|
|O|_|_|_|_|_|_|
+---+---+---+---+

Player 1 enter token (0 returns to menu):
```

The program will display a message that will show that a column is full when a Player tries to put their token in a full column.

Starting a Game when there is already a winner (feature)

```
Player 1 wins.

If you would like to play again then create a new game by entering 2.

Menu: (1)Start | (2)New | (9)Exit
Please enter your choice:
```

When the user tries to start a game straight after a Player has won the game, the program displays that a Player has won the game and if they'd like to play again then they must create a new game.

When a Game has tied (feature)

If the board is filled up and there is no winner, the program will display a message that says the game has ended in a tie and if they'd like to play a new game, then they must create a new game using the 'New' function.

Web-based Version

Navigation Bar (feature)



The navigation bar, conveniently placed at the top of every web page on the website, allows for easy access to the webpages.

How to Play text (feature)

How to Play

Objective

The objective of the game is for a player to connect four of their tokens in a straight line (horizontally, vertically or diagonally).

Instructions

Click on the 'play' link in the navigation bar above.

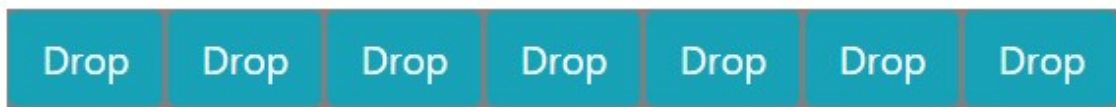
Once on the Play page in order to start the game you will first need to create a "New Game" by hitting the "New Game" button below.

In order to place a token, simply click the corresponding button above the column you would like to place your token in.

Once Player 1 has placed a token, Player 2 will be required to place a token and so on and so forth until there is a winner or the game has ended in a draw.

This piece of text located in the how to play page, tells the user how to play our Connect4 game.

Drop buttons (feature)



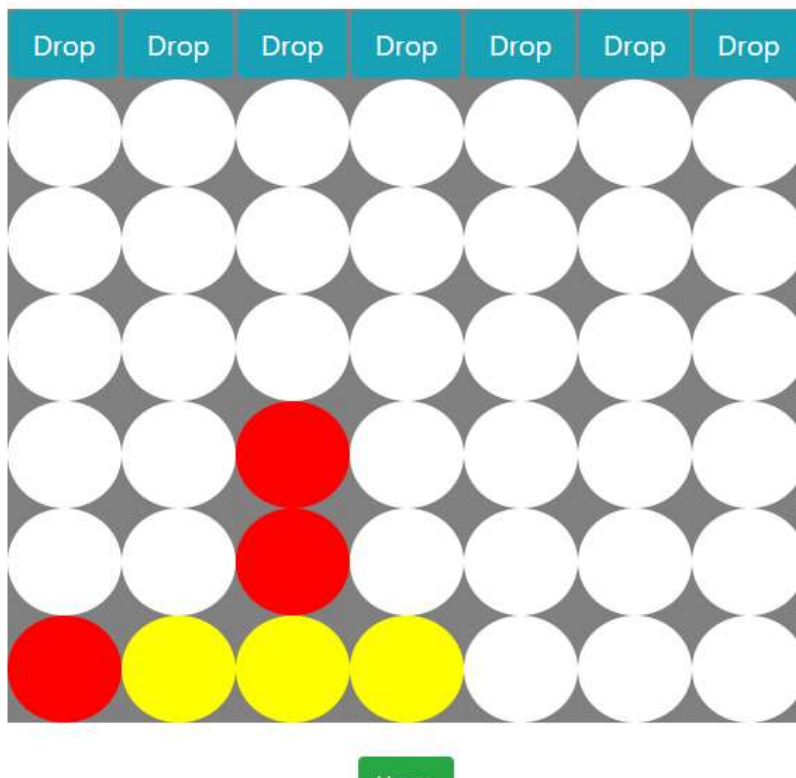
This helpful interface makes it easy for the Player to enter their column in to the corresponding column.

Player's Turn (feature)



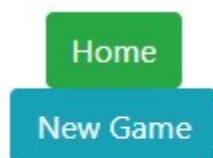
This shows whos turn it is throughout the whole game.

Graphical Tokens (feature)



Graphical tokens to show where the tokens are in the frame and they are distinct from each other. Player 1 has red tokens and Player 2 has yellow tokens.

Home button and New Game button (feature)



Home button for easily going back to the home page (how to play page) and a new game button which resets the game and clears the board.

Winner Message (feature)

Winner

Congratulations Player 1 wins!

If you would like to play again then create a new game by clicking the "New Game" button below.

New Game

A winner message appears when there is a winner with a button that creates a new game.

Games Rules

1. There is a minimum and maximum of 2 Players needed to play the game.
2. The game frame is exactly 7 columns by 6 rows.
3. Player 1 is always "O".
4. Player 2 is always "X".
5. Player 1 always starts the game.
6. Players take turns placing tokens into the game frame from the top.
7. In order to place a token the player first chooses which column they wish to insert a token. Once a column has been chosen the game will then find the next available space in that column starting from the bottom row. (This will fill the column from the bottom to the top of the column as more tokens are inserted in that column)
8. Players can pause the game at any point.
9. Within the menu (start or pause) the Player can exit the game.
10. Within the menu (start or pause) the Player can reset the game.
11. In order for a Player to win the game they need to connect 4 adjacent tokens (of their own type) in a straight line.
12. The adjacent tokens can be in any orientation as long as it forms a straight line of 4 tokens (horizontal, vertical or diagonal).
13. If a Player wins, then the game is finished and a message is displayed to show which Player won.
14. If the game board is completely full, then the game is finished and a message is displayed to show the game has ended in a draw.
15. Players will be notified if they have entered an invalid column and will be given another turn to choose a different column.
16. Players will be notified if they have entered an invalid input and will be given another turn to input something different.

